All ceramic restoration

COMPOSITION OF DENTAL PORCELAIN

1-The <u>feldspars 70-90%</u>

Mixtures of potassium aluminosilicate and sodium aluminosilicate.

The feldspar fuses when it melts, forming a glass matrix (give translucency)

2-The <u>quartz (silca) 11-18%</u>

remains unchanged during the firing process and acts as a strengthening agent

3-Kaolin 1- 10%

is a hydrated aluminum silicate ($Al2O.2SiO2.2H2O$) and acts as a binder, increasing the ability to mould the unfired porcelain. , it also increase opacity

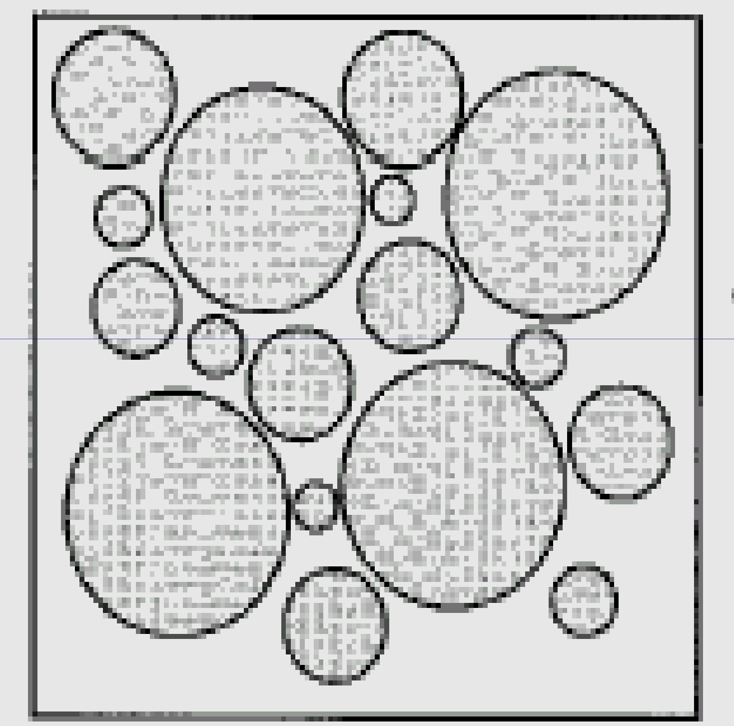
4-Metal oxides

which provide the wide variety of colors of the porcelain; for example, oxides of iron act as a brown pigment, copper as a green pigment, titanium as a yellowish-brown pigment, and cobalt imparts a blue color

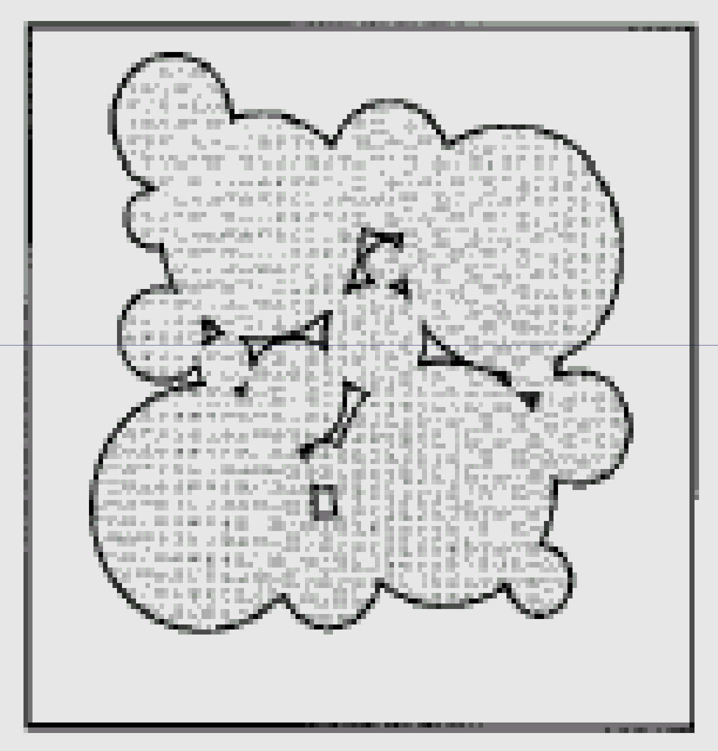
Fabrication procedure

- The manufacturer mixes the components, adds additional metal oxides, fuses them and then quenches the molten mass in water. The resultant product is known as a *frit*, and the process is known as *fritting*.

- A consequence of the rapid cooling is that large internal stresses build up in the glass, resulting in extensive cracking. This material can be ground very easily to produce a fine powder for use by the dental technician




Sintering



Requirements of dental porcelain

- Low fusing temperature
- Retains it form during firing
- Resistance to divitrification
- High viscosity

Jacket crown construction

Die preparation

Platinum foil matrix

- **Function**

  1- support of porcelain

  2- even radiation of heat during firing

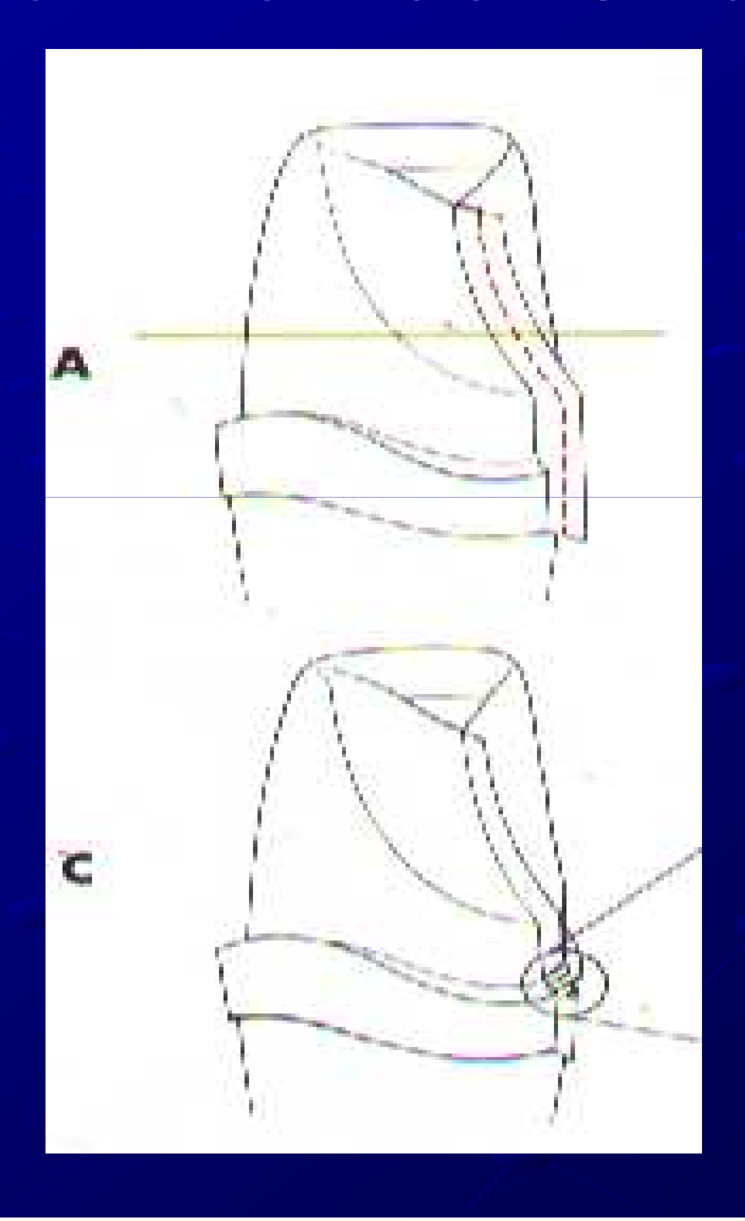
- **Properties of platinum matrix**

  1-Inert during firing

  2-Melting temperature higher than porcelain

  3-Supplied in soft sheet which is easily adapted on prepared tooth

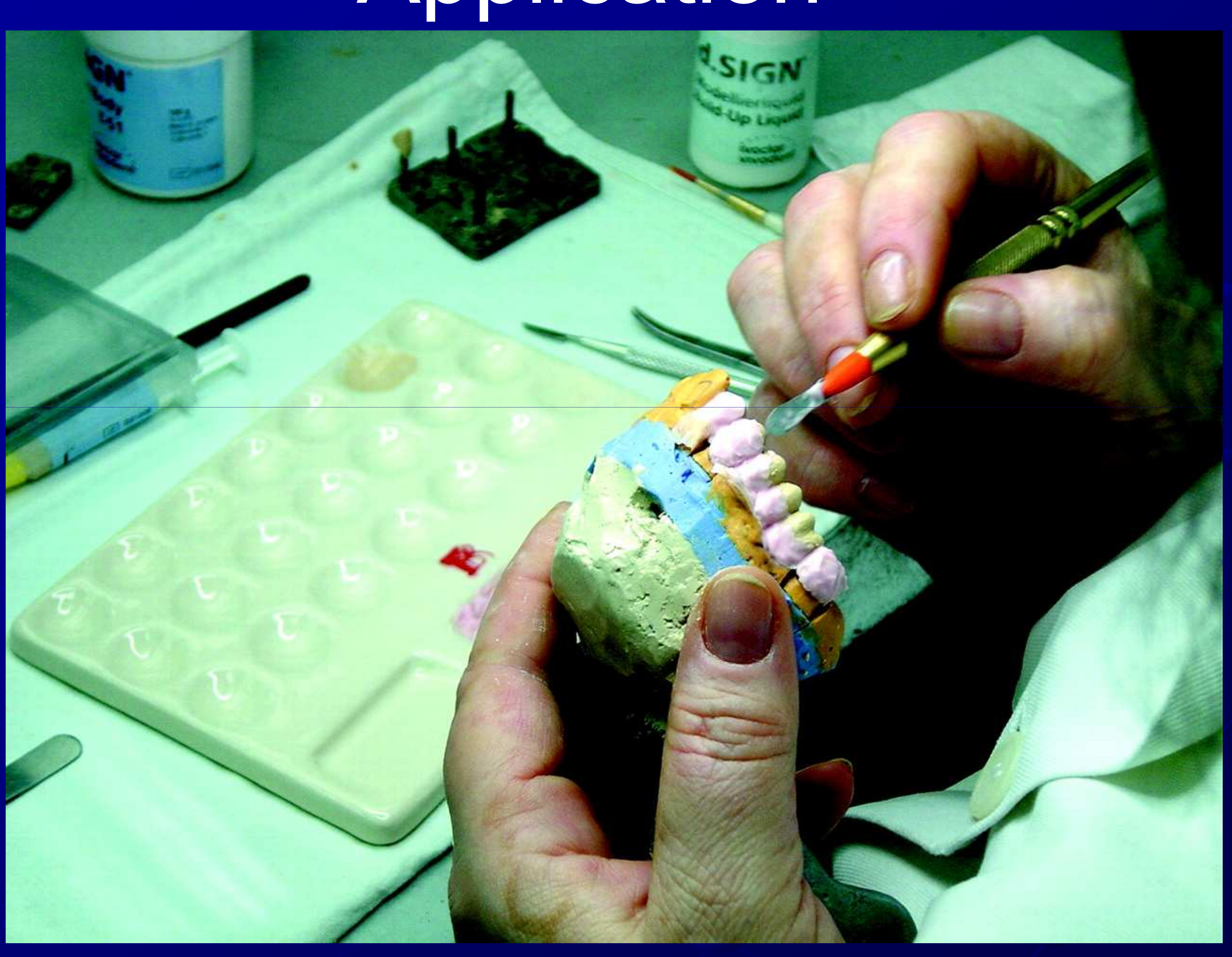
Platinum foil construction





Manipulation of dental porcelain

Application



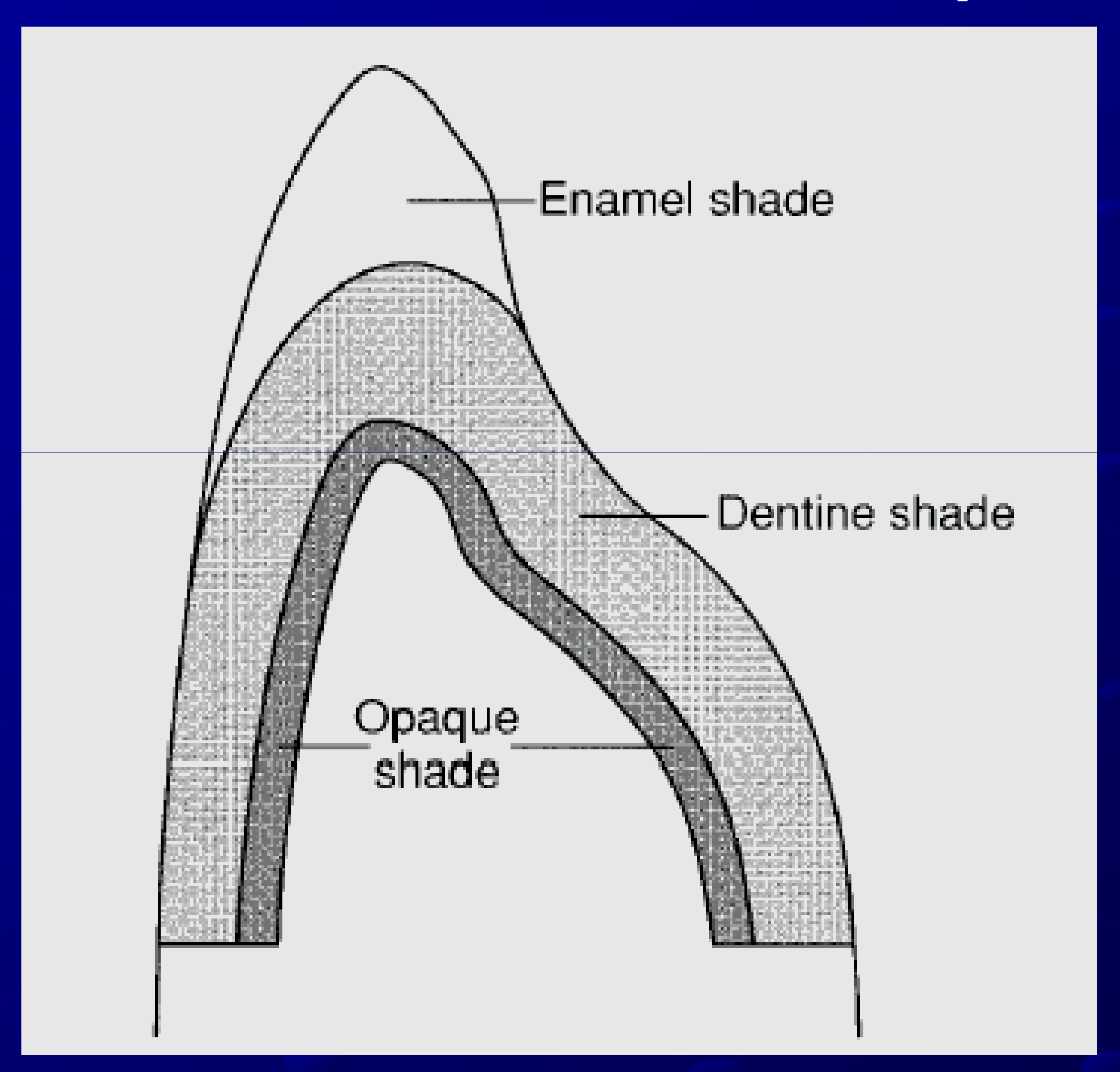
Condensation

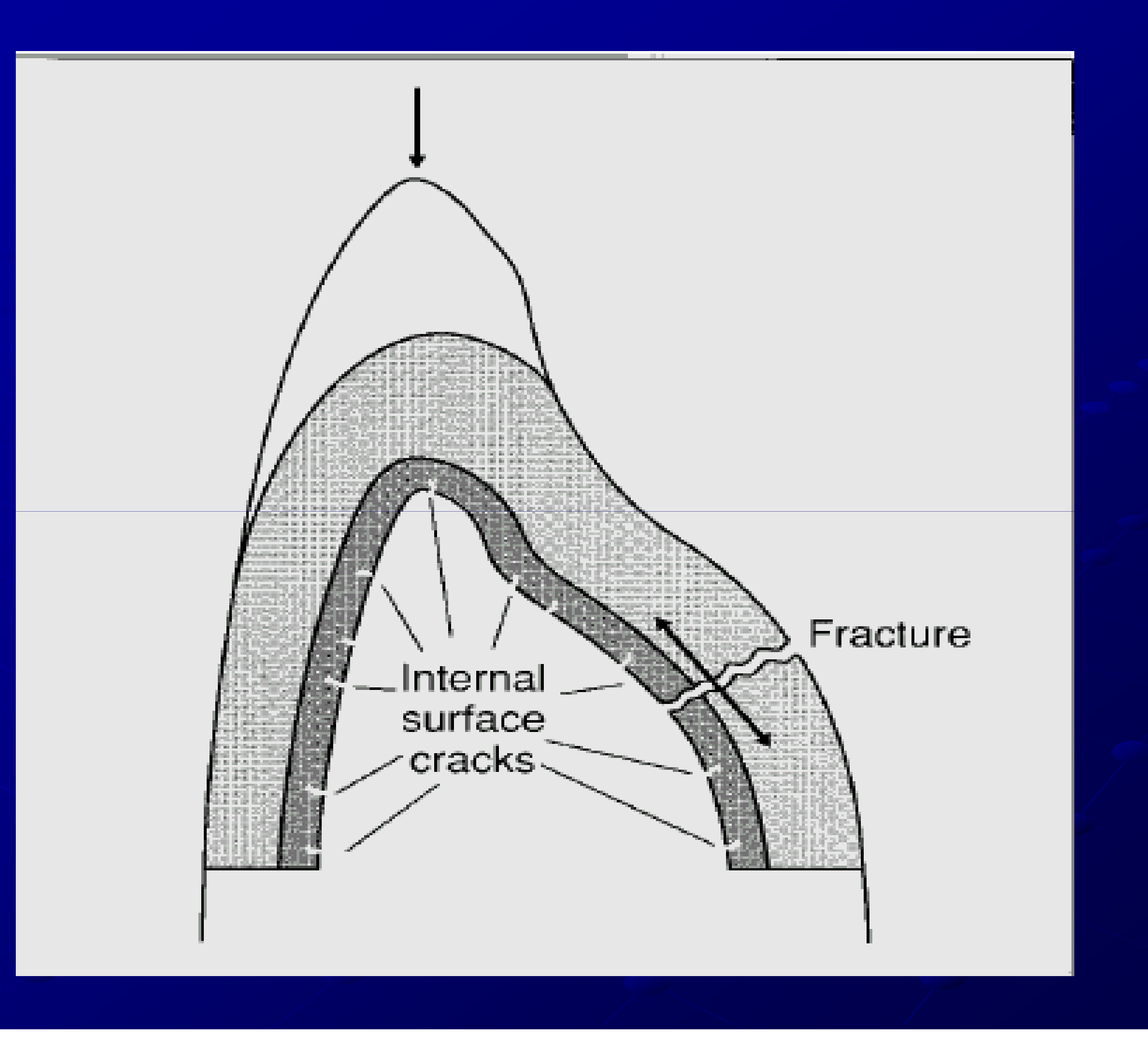
Purpose of condensation

1-remove excess water
2-adapt paste to the required form
3-decrease porosity
4-increase strength

- ## Methods of condensation
  1-Vibration
  2- Capillary attraction
  3-Spatulation

Porcelain build up




Fracture
Internal
surface
cracks

Reinforced ceramic core systems

- support is provided by another ceramic material

The addition of alumina to the feldspathic glass increases the strength of the core